miface PB

Universal Interface Profibus DP / Serial Interface RS232/485/422

User’s Manual

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Table of Contents

1 GENERAL 3

2 TECHNICAL DATA 3

2.1 Profibus DP Interface 4
2.1.1 Characteristic Data 4
2.1.2 DP Configuration Data 5
2.1.3 DP Diagnosis Data 6
2.1.4 DP Parameter Data 6
2.1.5 DP Output Data 6
2.1.6 DP Input Data 6

2.2 Transmit Data Frame (DP Output -> Serial Interface) 7

2.3 Receive Data Frame (Serial Interface -> DP Input) 8

3 CONNECTOR PIN ASSIGNMENTS 9

3.1 LEDs 9

3.2 Connectors 10

3.3 Settings 11

4 APPENDIX 13

4.1 Warranty / Liability 13

4.2 Declaration of Conformity 14

4.3 Versions Overview 15

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Universal Interface Profibus DP / Serial Interface RS232/485/422

1 General

Using the universal interface, Profibus DP output data are transmitted via the serial RS interface, and frames received by the serial RS interface are copied to the Profibus DP input data.

The mechanical design is laid out for top-hat rail mounting.
Settings for bus termination, address and options can be made simply by using DIP switches.

2 Technical Data

Specifications

Interface 1:	Profibus DP
Baud rate:	9,6 kBaud…12 MBaud
Addresses:	0…126
Interface 2:	RS232 / 485 / 422
Baud rate:	1200 to 115200 baud
Data formats:	7 / 8 Bit
Parity:	7 Bit: none (2 stop bits), 8 Bit: even, odd, none (1 stop bit)
Operating voltage:	+12…+30 VDC
Power consumption:	approx. 200 mA at 12 VDC approx. 100 mA at 24 VDC
Housing:	aluminium profile
Housing size:	26 x 105 x 70 mm (W x H x D)
Mounting:	to 35 mm DIN top hat rail
Protection:	Front panel: IP 00
Operating temperature:	0…+50 °C
Storage temperature:	-25…+60 °C

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2.1 Profibus DP Interface

2.1.1 Characteristic Data

ID Number:	$05D0_h$
GSD File:	MICR05D0.GSD
Cyclical User Data:	max. 200 bytes output, max 200 bytes input, max. 300 bytes output + input
Standard Configuration:	2x 0x3F (32 input-/output bytes)
Parameter Data:	Standard 7 Byte
User PRM:	none
Diagnosis:	Standard 6 Byte
External Diagnosis:	none
Transmission Speed:	9.6 kBaud / 19.2 kBaud / 93.75 kBaud / 187.5 kBaud / 500 kBaud / 1.5 MBaud / 3 MBaud, 6 MBaud, 12 MBaud
Protocol:	Profibus DP DIN19245, part 3

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2.1.2 DP Configuration Data

The configuration of the Profibus interface normally happens using the GSD file. It is initially imported into the "Device Catalog" of the configuration software. Subsequently, the Profibus interface can be “dragged” into the bus system and then be configured.

With the configuration, the user can individually adapt data width within the data transfer. Data widths of 1 to 16 bytes maximum are possible. By specifying these identifiers in any order, the desired total data width is set for both the input and the output data.

Data Identifier	Number of Bytes	Function / Description
0x10	1	Input data
0x11	2	Input data
:	:	:
0x1F	16	Input data
0x20	1	Output data
0x21	2	Output data
:	:	:
0x2F	16	Output data
0x30	1/1	Input / output data (1 byte each)
0x31	2/2	Input / output data (2 bytes each)
:	:	
0x3F	16/16	Input / output data (16 bytes each)

The maximum number of input and output bytes is 200 bytes each. However a total number of 300 bytes (input + output) may not be exceeded.

⇨ Default configuration: 2x 0x3F = 32 input and 32 output bytes

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2.1.3 DP Diagnosis Data

The interface does not support any extended diagnosis data. Default diagnosis is utilised.

2.1.4 DP Parameter Data

The User_Prm_Data are not utilised by the interface. However, a test is run to determine whether or not User_Prm_Data are transferred by the Profibus master. If User_Prm_Data are transferred, Profibus initialisation is disabled and the slave must be reconfigured and parameterised.

Note:
Standard parametrisation is required and is normally installed by the utilised DP configurators.

2.1.5 DP Output Data

The interface supports output data which have been configured to the length selected during configuration. The minimum number of output data is 0 bytes, the maximum number is 200 bytes.

Send frames are entered to the output data.

⇨ At least 3 output bytes are required if send frames are used.

2.1.6 DP Input Data

The interface supports input data which have been configured to the length selected during configuration. The minimum number of input data is 0 bytes, the maximum number is 200 bytes.

Receive frames are entered into the input data.

⇨ At least 3 input bytes are required if receive frames are used.

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2.2 Transmit Data Frame (DP Output -> Serial Interface)

DP Output					
Byte 1	**Byte 2**	**Byte 3**	**Byte 4**	**...**	**Byte n + 2**
Toggle byte	Length byte = n	Frame byte 1	Frame byte 2	...	Frame byte n

In order to transmit a frame via the serial interface, the individual frame bytes must be entered at the Profibus side as output bytes 3 through (n + 2). After the length byte (= frame length n) has been entered, the toggle byte must be changed in order to start transmission.

The toggle byte is not checked again until after the current frame has been transmitted. Transmission duration can be estimated based upon frame length and baud rate.

*Transmission duration (max.) = Frame length x (11 / baud rate) x 1.2

In addition, the delay through the processing on the master side, the Profibus transmission and the processing on slave side (< 5 ms) must be considered. **In many cases it is also possible to simply wait for the (mostly existing) response frame which is visible through the toggle byte change at DP input side.**

If too few DP output bytes have been configured, the frame is shortened accordingly!

Example:

Transmission of two frames (‘ABC’ and ‘DE’) one after the other in rapid succession to the RS interface

Sequence	**DP Output**				
▼	**Byte 1**	**Byte 2**	**Byte 3**	**Byte 4**	**Byte 5**
1. Start of Profibus DP communication	00_H	00_H	00_H	00_H	00_H
2. Enter frame data	00_H	03_H	41_H („A“)	42_H („B“)	43_H („C“)
3. Transmit frame and wait for transmission*	01_H	03_H	41_H	42_H	43_H
4. Enter data for next frame	01_H	02_H	44_H („D“)	45_H („E“)	XX_H
5. Transmit next frame and wait for transmission*	02_H	02_H	44_H	45_H	XX_H

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2.3 Receive Data Frame (Serial Interface -> DP Input)

DP Input					
Byte 1	**Byte 2**	**Byte 3**	**Byte 4**	**...**	**Byte n + 2**
Toggle byte	Length byte = n	Frame byte 1	Frame byte 2	...	Frame byte n

Each time a frame has been received via the serial interface (frame end recognised by means of timeout), it is entered as input bytes 3 through (n + 2), and the frame length (n) is entered as byte 2 (= length byte). The toggle byte is also increased by 1.

Thus only the toggle byte needs to be monitored at the Profibus side. As soon as it's value has changed, data can be read out from the received frame.

If too few DP input bytes are configured, the frame is shortened correspondingly!

The toggle byte is always set to 0 after Profibus communication is initialised.

Example:

Two frames ("Hello" and "World") are received via the RS interface.

Sequence	**DP Input**						
▼	**Byte 1**	**Byte 2**	**Byte 3**	**Byte 4**	**Byte 5**	**Byte 6**	**Byte 7**
1. Start of Profibus-communication	00_H	00_H	00_H	00_H	00_H	00_H	00_H
2. Frame "Hello" was received	01_H	05_H	48_H ("H")	65_H ("e")	$6C_H$ ("l")	$6C_H$ ("l")	41_H ("o")
3. Frame "World" was received	02_H	05_H	57_H ("W")	41_H ("o")	72_H ("r")	$6C_H$ ("l")	64_H ("d")

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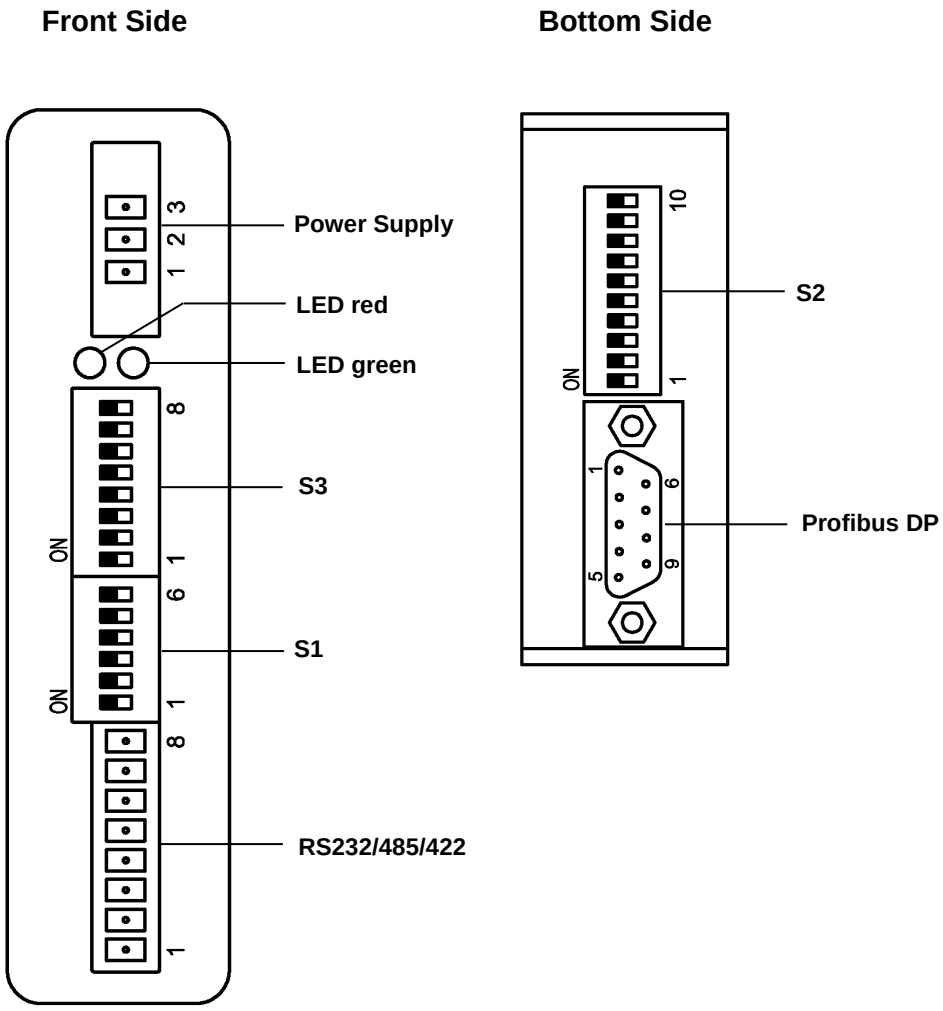
3 Connector Pin Assignments



3.1 LEDs

LED	Status	Meaning
red (FAULT)	ON	no Profibus DP connection or RAM error (if green LED OFF)
	OFF	Profibus DP connection established
green (RUN)	OFF	Controller is not running (hardware error)
	ON	Controller is running
	temporary OFF (blinking)	UART communication (frame has been sent or received)

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3.2 Connectors

Power Supply

Pin	Assignment
1	+12…+30 VDC
2	GND
3	PE

RS

Pin	RS232	RS485	RS422
1	RxD		
2	TxD		
3	GND	GND	GND
4		Rx/Tx +	Rx +
5		Rx/Tx -	Rx -
6			Tx +
7			Tx -
8	PE	PE	PE

See chapter „Settings“ for interface selection.

Profibus DP

Pin	Assignment
1	
2	
3	Rx+ / Tx+
4	RTS
5	GND, electrically isolated
6	+5V, electrically isolated
7	
8	Rx- / Tx-
9	

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3.3 Settings

Notes:

- See the marking on the DIP switches to determine ON/OFF positions
- The DIP switches may generally only be changed while power is OFF!
- Delivery settings: Following grey-coloured table entries

Switch S1 / S3-DIP7: Interface Selection

	Switch S1						Switch S3
Interface	**DIP1**	**DIP2**	**DIP3**	**DIP4**	**DIP5**	**DIP6**	**DIP7**
RS232	ON	OFF	OFF	OFF	OFF	OFF	OFF
RS422 without bus termination	OFF	ON	OFF	OFF	OFF	OFF	ON
RS422 with bus termination	OFF	ON	OFF	OFF	ON	ON	ON
RS485 without bus termination	OFF	ON	ON	ON	OFF	OFF	OFF
RS485 with bus termination	OFF	ON	ON	ON	ON	ON	OFF

Switch S2: Profibus Address, Bus Termination

DIP Switch	Function
DIP 1	DP address Bit 2^0 (ON = 1)
DIP 2	DP address Bit 2^1 (ON = 2)
DIP 3	DP address Bit 2^2 (ON = 4)
DIP 4	DP address Bit 2^3 (ON = 8)
DIP 5	DP address Bit 2^4 (ON = 16)
DIP 6	DP address Bit 2^5 (ON = 32)
DIP 7	DP address Bit 2^6 (ON = 64)
DIP 8	reserved (= OFF)
DIP 9	both ON: Profibus bus termination activated
DIP 10	both OFF: no Profibus bus termination

Note: Only DP addresses 0 through 126 are allowed!
Delivery setting: DP address = 3

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Switch S3: RS Interface Parameters

Baud Rate	DIP 1	DIP 2	DIP 3
1200	OFF	OFF	OFF
2400	ON	OFF	OFF
4800	OFF	ON	OFF
9600	ON	ON	OFF
19200	OFF	OFF	ON
38400	ON	OFF	ON
57600	OFF	ON	ON
115200	ON	ON	ON

Data Format	DIP 4	DIP 5
8 / N / 1	OFF	OFF
8 / E / 1	ON	OFF
8 / O / 1	OFF	ON
7 / N / 2	ON	ON

Receive Timeout*	DIP 6	Baud Rate / Receive Timeout
short	OFF	1200 Baud / 29 ms
		2400 Baud / 16 ms
		4800 Baud / 9 ms
		9600 Baud / 6 ms
		19200 Baud / 4 ms
		38400 Baud / 3 ms
		57600 Baud / 3 ms
		115200 Baud / 3 ms
long	ON	1200 Baud / 200 ms
		2400 Baud / 100 ms
		4800 Baud / 50 ms
		9600 Baud / 25 ms
		19200 Baud / 13 ms
		38400 Baud / 10 ms
		57600 Baud / 10 ms
		115200 Baud / 10 ms

* Determines, after which duration a receive frame is considered to be finished and should be announced to the Profibus DP (duration after the last received byte). The interval between the individual frame bytes may not exceed this duration (otherwise this would be interpreted as the end of the frame).

Mode	DIP 8
Standard	OFF
migan (not relevant)	ON

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4 Appendix

4.1 Warranty / Liability

For the product, liability is assumed for defects, which existed at the delivery date according to our General Terms and Conditions.

Technically changes as well as errors are excepted. A claim for delivery of a new product does not exist. The buyer has to check the received product immediately and indicate evident defects at the latest 24 hours after detection. Non-observance of notification requirements is equated with acceptance of the defect. Not immediately visible defects have to be indicated immediately after their perception too.

Generally, defects and their symptoms must be described as accurately as possible in order to allow for reproducibility and elimination. The buyer must provide for access to the relevant device and all required and/or useful information at no charge and must make all of the required data and machine time available free of charge.

The guarantee does not cover defects, which result from non-observance of the prescribed conditions of use, or from improper handling.

If the device has been placed at the disposal of the buyer for test purposes and has been purchased subsequent to such testing, both parties agree that the product is to be considered “used” and that it has been purchased “as is”. No guarantee claims may be made in such cases.

The General Terms and Conditions of microSYST Systemelectronic GmbH in current version apply as well.

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4.2 Declaration of Conformity

EG-Konformitätserklärung

Declaration of EC-Conformity

Produktbezeichnung: **miface PB**
Product name:

Produktbeschreibung: Universa-Interface Profibus-DP / Serielle Schnittstelle /
Product description: Universal Interface Profibus DP / Serial Interface

Hersteller: microSYST Systemelectronic GmbH
Manufacturer: Albert-Einstein-Straße 7
92637 Weiden

Das bezeichnete Produkt stimmt mit der folgenden Europäischen Richtlinie überein: We herewith confirm that the above mentioned product meets the requirements of the following standard:		**Die Übereinstimmung des bezeichneten Produktes mit den Vorschriften der Richtlinie wird nachgewiesen durch die vollständige Einhaltung folgender Normen:** The correspondence of the above mentioned product with these requirements is proved by the fact that these products meet with the following single standards:
Nummer	**Bezeichnung**	**Europäische Norm**
2004/108/EG	**Elektromagnetische Verträglichkeit (EMV)**	EN61000-6-2:2006
		EN61000-6-3:2007

Weiden, den 23.05.2012

ppa. H. Kilian

Harald Kilian

Leiter operatives Geschäft / COO
Prokurist / Authorized Signatory

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4.3 Versions Overview

Version	Date	Comments
1.00	2012-09-17	Kreuzer, Nickl: Document created
1.10	2013-03-26	Company address, warranty
1.20	2013-10-17	Logo
1.30	2014-07-22	Operating voltage

Certified per **DIN ISO 9001**.

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